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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
08/847,967	04/22/1997	Isy Goldwasser	10416-105013	2173

78230 7590 07/02/2008
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EXAMINER	
EPPERSON, JON D	

ART UNIT	PAPER NUMBER
1639	

MAIL DATE	DELIVERY MODE
07/02/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	08/847,967	GOLDWASSER ET AL.	
	Examiner	Art Unit	
	Jon D. Epperson	1639	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 October 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *15-24,26,30-35,42,43,45-48,51-56,58-60,64-72,74-91,93-97 and 99* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *15-24,26,30-35,42,43,45-48,51-56,58-60,64-72,74-91,93,95,96 and 99* is/are rejected.

7)☒ Claim(s) *94 and 97* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Request for Continued Examination (RCE)

1. A request for continued examination (RCE) under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection (e.g., see 10/9/07 response). Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 4/10/07 has been entered. Claims 8, 10, 11, 15-24, 26, 30-35, 42, 43, 45-49, 51-56, 58-60, 64-72, 74-91 and 93-99 were previously pending. Applicants canceled claims 8, 10, 11, 49, and 98. In addition, claims 42, 47, 68, 70, 72, 74, 84, and 88 were amended. Therefore, claims 15-24, 26, 30-35, 42, 43, 45-48, 51-56, 58-60, 64-72, 74-91, 93-97, and 99 are currently pending and examined on the merits.

Those sections of Title 35, US code, not included in the instant action can be found in previous office actions.

Withdrawn Objections/Rejections

2. All rejections are withdrawn in view of Applicants' arguments and/or amendments. The Pohm et al. rejections under 35 U.S.C. §§ 102 and 103 are withdrawn in view of Applicants' amendments and the declarations set forth by John A. Reed and Daniel M. Giaquinta on 4/10/07 under 37 C.F.R. § 1.132 in favor of the newly cited rejections below.

New Rejections

Claims Rejections - 35 U.S.C. 102

3. Claims 15-19, 23, 24, 26, 30-33, 42, 43, 45-49, 51-55, 59, 60, 64-72, 74-78, 80, 82, 83, 88-91, 93, 96 and 99 are rejected under 35 U.S.C. 102(b) as being anticipated by Pohm et al. (Pohm, A. –V.; Wang, J. -M.; Lee, F. S.; Schnasse, W.; Smay, T. A. "High-Density Very Efficient Magnetic Film Memory Arrays" IEEE Transactions on Magnetics, **1969**, Mag-5, 3, 408-412) as evidenced by Maxwell et al. (Maxwell, J.; Doty, M. "Processing Guidelines for S.M.P.S. Multilayer Ceramic Capacitors", 2005, 1-6) and Kitada et al. (Kitada, M.; Yamamoto, H.; Tsuchiya, H. "Reaction Between Permalloy and Several Thin Metal Films" Thin Solid Films **1984**, *122*, 173-182) and Mattox (Mattox, D. M. "Physical Vapor Deposition (PVD) Processes" *Metal Finishing 2002*, Volume 100, Supplement 1, Pages 394-408).

For ***claims 42 and 68***, Pohm et al. (see entire document) disclose a method for forming a memory array (e.g., see Pohm et al, abstract), which anticipates the claimed invention. For example, Pohm et al. disclose forming ten or more inorganic materials on ten or more predefined discrete regions of a rigid substrate using a mask (e.g., see figure 1 showing >10 inorganic materials formed on a rigid glass substrate the locations of which were "predefined" by the use a flat wire mask and sequential vapor deposition techniques; see also Table I showing composition of inorganic materials that were deposited at each site including Cr, Ni-Fe, Cu and Ti; see also Experimental Equipment and Results section). In addition, Pohm et al. disclose that each of the materials is different from each other (e.g., see figure 1 wherein each material differs in terms of its

shape, size, spacing, location, etc.) For example, compare a material on the outer edge of the array to a material in the center of the array wherein one is large and one is small (see also paragraph bridging pages 408 and 409, "Different spacing, both in word and digit line directions, were provided so <u>different sized storage cells</u> could be studied and compared"; see also page 410, paragraph 1, "… word lines with widths of 0.001, 0.002, 0.003 and 0.004 inch were deposited"; see especially figure 2 showing formation of different sizes and shapes). Pohm et al. also disclose forming the array by delivering a first component of the material to the respective predefined discrete region of the substrate to form a first solid layer of the first component on the substrate and delivering a second component of the material to the respective predefined discrete region to form a second solid layer of the second component on the first layer (e.g., see figure 1 wherein the "Cr" is delivered to a first region on the substrate as a "first component" and "Ni-Fe" is delivered as a "second component" and forms a layer on top of the first layer; alternatively see Table 1 showing that Ni-Fe, Cu and Ti could also be the "first component" with Cu, Ti or Ni-Fe as the second component i.e., any layer that is deposited before another layer can be considered as the "first component"; see also Experimental Equipment and Results section, "The experimental film arrays were made by <u>sequential vapor deposition</u> … The <u>evaporation mask</u> consists of two orthogonal nickel-chrome wire configurations"; see also specification, page 13, line 20 showing that component can form "layers").

In addition, although Pohm et al. do not expressly state that they are varying the composition, concentration, or thickness of the delivered first of second components between respective regions, it is respectfully submitted that Pohm et al. inherently discloses this feature as evidenced by Mattox. For example, Mattox discloses that a vapor deposition process like the one disclosed by Pohm et al. will result in a cosine distribution of materials on the substrate (e.g., see Pohm et al., figure 4). A point directly across from the source (zero degrees) will acquire more material (i.e., result in a thicker layer) than a point located farther away (e.g., 30 degrees). Thus, a person of skill in the art would expect an uneven thickness as shown in figure 4 as a result of the dependence on the angle of incidence and other factors noted in text especially in the absence of some “curative” techniques (e.g., see Mattox, page 398, last paragraph, “The strong dependence of deposition rate on geometry and time often requires that fixturing and tooling be used to randomize the substrate(s) position during deposition in order to increase the film thickness uniformity. This fixturing also randomizes the angle of incidence of the depositing vapor flux, thereby increasing [note that “perfect” uniformity is not achieved even with these “curative” techniques] the uniformity of the film properties over the substrate(s) surface”; see also previous paragraph on same page discussing various other factors that can affect the thickness of the layers). Thus, it is clear from Mattox that Pohm is distributing uneven layers of materials onto the substrate based at least in part on this relationship between the distribution rate and the angle of incidence for deposition (e.g., see Pohm et al., figure 1 showing larger amounts of

materials in the center than at the periphery; see also page 409, column 1, second full paragraph, "Consequently, some sensitivity to angle-of-incidence effects was evident"). Finally, Pohm et al. disclose a sufficient amount of space between the ten or more regions such that the delivered components do not substantially interdiffuse between the ten or more regions of the substrate (e.g., see figures 1-2; see also Evaporation Mask and Procedure section).

For ***claims 15-19 and 82***, Pohm et al. disclose one thousand or more different materials comprising two or more layers with a density greater than about 10 regions per cm^2 (e.g., see page 411, column 2, paragraph 1, "For example, two 2 by 2-inch substrates should be capable of storing 1024 128-bit words or more"; see also claim 72 above with regard to the density limitation).

For ***claims 23 and 75***, Pohm et al. disclose ten or more regions of the substrate that are defined by chemical or physical barriers such as a mask (e.g., see page 408, column 2, last paragraph wherein a nickel-chrome wire mask is disclosed; see also figure 2).

For ***claim 24***, Pohm et al. disclose chemical vapor deposition techniques (e.g., see Pohm et al., page 408, column 2, "Evaporation Mask and Procedure" section).

For ***claim 26***, Pohm et al. disclose useful magnetic and/or electrical properties (e.g., see figures 3-6).

For ***claims 30-33***, Pohm et al. disclose five different components including Cr, Ni-Fe, Cu, Ti and a second Ni-Fe (e.g., see Table I) and also the use of ferrite i.e., a sixth component (e.g., see figure 1).

For ***claims 43, 69 and 71***, Pohm et al. disclose screening the at least ten different materials for a useful property of interest, and determining the relative performance of at least ten different materials with respect to the property of interest (e.g., see figure 3 where signal current is monitored for different size words lines on the array; see also figure 4-6).

For ***claim 45***, Pohm et al. disclose "layers" of the delivered components (e.g., see Table I and figure 1).

For ***claims 46-48 and 77***, Pohm et al. also disclose a method wherein each of the at least the different materials further comprises allowing the delivered first and second components of the material to simultaneously interact under a set of conditions (e.g., see figures 3-6; see also page 411, connections section).

For ***claims 51-55 and 72***, Pohm et al. also disclose, in addition to the limitations discussed above, forming one hundred or more solid inorganic materials on one hundred or more predefined discrete regions of a rigid substrate, respectively, each of at least one hundred of the materials being different from each other (e.g., see figure 1(a) showing ~150 different solid inorganic materials located at predefined positions in an array which differ is size, shape and composition as discussed above, for example, in claim 68). Pohm et al. also disclose allowing the delivered first and second components of the

material to simultaneously interact under a set of conditions (e.g., figure 3 wherein materials interact to produce a signal; see also figures 4-6). Pohm et al. also disclose a substrate comprising at least one hundred material-containing regions at a density of greater than about 10 regions per cm^2 (e.g., see page 410 column 1, paragraph 1 disclosing 0.008 inch, i.e., ~.02 centimeters, element-to-element distance, which would provide ~ 50 elements × 50 elements = 250 elements/cm^2). Pohm et al. also disclose screening these elements for their ability to function in computer memory storage (e.g., see figures; see also page 411, column 2, paragraph 1, "The extremely high element density permits a single manufactured unit of modest size and cost to embody a relatively large storage array. For example, two 2 by 2 inch substrates should be capable of storing 1024 128-bit words or more").

For ***claim 59***, Pohm et al. disclose metal alloys (e.g., see Table 1 wherein Ni-Fe is disclosed).

For ***claim 60***, Pohm et al. disclose the use of ceramics such as ferrite (e.g., see figure 1).

For ***claim 64***, Pohm et al. disclose solid delivery (e.g., see figures 1 and 2).

For ***claim 65***, Pohm et al. disclose sequential deposition of three layers (e.g., see figures 1 and 2; see also Table I; see also Experimental section).

For ***claim 66***, Pohm et al. disclose electron beam evaporation (e.g., see page 408, column 2, second to last paragraph, "The experimental film arrays were made by sequential vapor deposition of the different materials by electron beam heating").

For ***claims 67 and 83***, Pohm et al. disclose components that are both different (e.g., see Table 1 showing different thicknesses; see also figure 2 showing different word dimensions) and the same (e.g., see figure 2 showing materials with the same spacing; see also figures 3 and 6 showing, for example, permalloy layers of the same height). In addition, the Examiner notes that both the "same" and "different" compositions and/or thickness would be immediately envisioned by a person of skill in the art from the teachings of the reference when taken as a whole because Pohm et al. disclose that these steps were routine in the art (e.g., see *In re Graves*, 69 F.3d 1147, 36 USPQ2d 1697 (Fed. Cir. 1995) (prior art reference disclosing a system for testing the integrity of electrical interconnections that did not specifically disclose simultaneous monitoring of output points still anticipated claimed invention if simultaneous monitoring is within the knowledge of a skilled artisan); see also *In re Donohue*, 766 F.2d 531, 533 (Fed. Cir. 1985) (prior art anticipates a claim if it discloses the claimed invention such that a skilled artisan could take its teachings and his own knowledge to possess the claimed invention); see also *In re LeGrice*, 301 F.2d 929, 936 (C.C.P.A. 1962) (same); see also *In re Best* 562 F.2d 1252, 1254, 195 USPQ 430,433 (CCPA 1997). Evidence that these steps are within the knowledge of a skilled artisan in accordance with *In re Graves* (see above) can be illustrated by the Pohm et al. reference itself which calls these steps "rudimentary" (e.g., see page 411, column 2, paragraph 1).

For ***claim 70***, Pohm et al. also disclose, in addition to the limitations discussed above, delivering five or more components of the material to the respective predefined

discrete region of the substrate to form five or more solid layers of the delivered components, each of at least five of the delivered components being an inorganic element or compound (e.g., see Table 1 wherein the 5 layers are numbered 1-5 and include C4, Ni-Fe, Cu, Ti and Ni-Fe).

For ***claim 74***, Pohm et al. also disclose the use of composite materials in addition to the limitations discussed above (e.g., see Table I wherein the Cr, Ni-Fe, Cu, Ti and Ni-Fe layers represent the constituents of the composite materials because they "retain their identities" even when they act in concert for the purpose of computer memory storage; see also specification, page 17, lines 1-6 wherein composite materials are defined).

For ***claim 76***, Pohm et al. also disclose wells formed by layers of chromium (e.g., see figure 1, showing 0.004'' well formed between two Cr/Cu layers).

For ***claims 78 and 80***, Pohm et al. disclose 10 or more inorganic materials (e.g., see figures 1 and 2 showing materials formed by various layers of Cr, Ni-Fe, Cu, Ti and Ni-Fe).

For ***claim 88 and 89***, Pohm et al. also disclose "repeating" the steps of deposition and varying the composition, concentration, or thickness of the delivered first and second components (e.g., see figures 1 and 2 where the steps are "repeated" in different regions) and further disclose screening this array for its ability to function in memory storage as described above.

For ***claim 90***, Pohm et al. also disclose fiver layers and thus includes a third layer (e.g., see Table I).

For ***claim 91***, Pohm et al. also disclose annealing with, for example, soldering techniques (e.g., see page 411, paragraph bridging columns 1-2).

For ***claim 93***, Pohm et al. do not disclose the exact soldering temperature but the Examiner contends that about 200-300 °C would inherently be disclosed by Pohm et al. as evidenced by Maxwell (e.g., see Maxwell et al., page 5, column 1, paragraph 1), which shows tat "reflow soldering" is typically performed at 220-225 °C and must be performed at least at 200-205°C to insure proper wetting and solder joint formation.

For ***claims 96 and 99***, Pohm et al. disclose changing the composition between regions by depositing layers of different thicknesses (e.g., see above, claim 68, table outlining different compositions).

Response

4. To the extent that Applicants' arguments could be applied against the current rejection, the following comments below are noted:

[1] Applicants argue, "the word stoichiometry [has been deleted] from the claims" (e.g., see 4/10/07 response, pages 15 and 16, especially paragraph 1 on page 16).

[1] It is noted that the above rejection has bee modified to reflect this change.

[2] Applicants argue, "As Mr. Reed Explains [in the 37 C.F.R. § 1.132 declaration] … Each die of the plurality of die contained on each processed wafer, would have identical film thickness parameters, at least within the range of normal processing tolerances … in order to

obtain experimental test devices with differing film thickness parameters would require processing separate wafers differently (i.e., by varying deposition times) to obtain the different results … [the Examiner provides mere] speculation that Pohm would have had the ability to vary the thicknesses between dice on a single wafer … Pohm neither disclosed nor suggested any ability to deposit to only one site, so Pohm's dice all would necessarily have the same thicknesses" (e.g., see 4/10/07 response, page 17, first full paragraph; see also Reed declaration).

[2] The Examiner agrees with Mr. Reed's position to the extent that the Examiner's table (e.g., see 10/12/06 final office action, bottom of page 3) was too speculative and has amended the rejection to reflect that the thickness variations occur instead from "angle of incidence" effects and/or other factors like uneven vaporization rates, contamination, etc. as evidenced by Mattox (e.g., see newly amended rejection above).

[3] Applicants argue, "Dr. Giaquinta also confirms [in his 35 C.F.R. § 1.132 declaration] that the Pohm reference does not disclose the elements of the claimed invention. Pohm does not disclose or suggest preparing arrays of diverse materials using a protocol that includes varying the composition, concentration or thickness of the delivered … component, as compared between respective material-containing regions" (e.g., see 4/10/07 response, page 17, last two full paragraphs).

[3] Although this statement is not entirely clear, the amended rejection above makes clear that the thickness is varied based on the cosine relationship with the angle of incidence from the source. Thus, Pohm inherently discloses varying the thickness, for example, of the first or

second components between respective regions. That is, a region directly across from the source will be thicker than a region on the periphery, which is visually verifiable (see Pohm, figure 1).

[4] Applicants argue, "Pohm [according to Dr. Giaquinta] does not deposit components of materials into different regions of a substrate to form different materials as required by the claims" (e.g., see 4/10/07 response, page 17, last full paragraph; see also Giaquinta declaration, paragraph 9, last sentence, "the materials in each region of Pohm are not different on the basis of the composition, concentration or thickness of the delivered … component, as required by the claims").

[4] In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., the materials in each region of Pohm are different on the basis of compositions, concentration or thickness) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). The claims merely require that the materials be different, not that they be different on the basis of composition, concentration or thickness. For example, claim 42 reads, "each of at least ten of the materials being different from each other", it does not read, contrary to Applicants' assertions, "each of at least ten of the materials being different from each other on the basis of composition, concentration or thickness." In addition, the thickness of the materials as noted above using the Mattox reference as evidence are different in each region. Furthermore, the size and shape of each material differs

as conceded by Applicants (e.g., see page 18, last paragraph, “the only difference between the regions of Pohm are the physical size [and presumably shape] of the regions”; see also figure 1 in Pohm demonstrating different shapes).

Claim Rejections - 35 USC § 103

5. Claims 15-24, 26, 30-35, 42, 43, 45-48, 51-56, 58-60, 64-72, 74-91, 93, 95, 96, and 99 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pohm et al. (Pohm, A. –V.; Wang, J. -M.; Lee, F. S.; Schnasse, W.; Smay, T. A. “High-Density Very Efficient Magnetic Film Memory Arrays” IEEE Transactions on Magnetics, **1969**, Mag-5, 3, 408-412) in view of Howard et al. (Howard, J. K.; White, J. F.; Ho, P. S. “Intermetallic compounds of Al and transitions metals: Effect of electromigration in 1-2-μm-wide lines” J. Appl. Phys. 49(7), 1978, 4083-4093) and Makino et al. (Makino, K.; Kawakami, S.; Orihara, S.; Sakai, S. “A Highly Reliable Plated Wire: Study on Corrosion of Magnetic Films” IEEE Transactions on Magnetics **1973**, Mag-9, 3, 500-503) and Lee (Lee, F. S. “A High-Density Coupled-Magnetic-Film Memory Array” IEEE Transactions on Magnetics 1971, Mag-7, 4, 808-872) and Brown et al. (Brown, et al. “High Density Devices using Permalloy propagation of wall-coded bubbles” IEEE Transactions on Magnetics **1979**, Mag-15, 6, 1501-1506) and Jubb et al. (Jubb et al., “Coercivity, structure, and stoichiometry of Permalloy/alumina multilayers” J. Appl. Phys. **1985**, 57, 1, 4192-4194) as evidenced by Maxwell et al. (Maxwell, J.; Doty, M. “Processing Guidelines for S.M.P.S. Multilayer Ceramic Capacitors”, 2005, 1-6) and Kitada et al. (Kitada, M.; Yamamoto, H.; Tsuchiya, H. “Reaction Between Permalloy and Several Thin Metal Films” Thin Solid Films **1984**, *122*, 173-182).

For ***claims 15-19, 23, 24, 26, 30-33, 42, 43, 45-48, 51-55, 59, 60, 64-72, 74-78, 80, 82, 83, 88-91, 93, 96 and 99***, Pohm et al. teach all the limitations stated in the 35 U.S.C. 102(b) rejection above (incorporated in its entirety herein by reference), which anticipates and, as a result, renders obvious claims 15-19, 23, 24, 26, 30-33, 42, 43, 45-48, 51-55, 59, 60, 64-72, 74-78, 80, 82, 83, 88-91, 93, 96 and 99. *Connell v. Sears, Roebuck & Co.*, 722 F.2d 1542, 1548 (Fed. Cir. 1983) ("anticipation is the epitome of obviousness"); see also *In re Skoner*, 517 F.2d 947, 950, 186 USPQ 80, 83 (CCPA 1975); *In re Pearson*, 494 F.2d 1399, 1402, 181 USPQ 641, 644 (CCPA 1974).

The prior art teaching of Pohm et al. differ from the claimed invention as follows:

For ***claims 20-22, 56 and 81***, Pohm et al. do not disclose 10,000-1,000,000 different materials. Pohm et al. only disclose ~1,000 materials on the array (e.g., see Pohm et al. rejection for claim 19 under 35 U.S.C. 102(b) above).

For ***claims 34, 35 and 69***, Pohm et al. fail to disclose a total of 7 or 8 components and/or the use of polymeric materials

For ***claim 58***, Pohm et al. fail to disclose the use of intermetallics.

For ***claims 84-87***, Pohm et al. fail to disclose the use of a "gradient" between respective regions.

For ***claim 95***, Pohm et al. do not disclose three layers with thickness ranging from about 100 A to 1000 A.

However, the combined references of Lee, Brown et al., Makin et al., Jubb et al., and Howard et al. teach the following limitations that are deficient in Pohm et al.:

For ***claims 15-19, 23, 24, 26, 30-33, 42, 43, 45-48, 51-55, 59, 60, 64-72, 74-78, 80, 82, 83, 88-91, 93, 96 and 99***, the combined references of Lee, Brown et al., Makin et al., Jubb et al., and Howard et al. also provide teachings and motivation to deposit different "thicknesses" at each position of the array (e.g., see Jubb et al., "The conditions of permalloy and alumina-layer thickness, and substrate bias necessary to minimize the coercivity has been shown"). Thus, a person of skill in the art would have been motivated to use different thicknesses to optimize a parameter that was known to be result determinative when studying the properties of these materials (see also Jubb et al., figure 1 wherein the thickness was expressly studied; see also figure 2; see also results and discussion pertaining to figures 1 and 2 starting on page 4193).

For ***claims 20-22, 56 and 81***, the combined references of Lee, Makino and Howard et al. teach the use of "high density" magnetic memory arrays (e.g., see Lee, abstract; see also page 808, column 2, paragraph 1 wherein >6400 elements/in^2 are disclosed; see also Brown et al., figure 1, wherein the spacing between elements is reduced by a factor of 1000 to 1-2 μm). With respect to the repetition of steps and/or duplication of parts (i.e. number of samples analyzed or number of substrate regions), the courts have consistently held that the mere duplication of parts has no patentable significance unless new and unexpected results are produced (e.g., see *In re Harza*, 274 F.2d 669, 671, 124 USPQ 378, 380 (CCPA 1960)) ("It is well settled that the mere duplication of parts has no patentable significance unless a new and unexpected result is produced . . . . "). Here, a person would have been motivated to make larger arrays with

a larger number of materials to increase the memory capacity (i.e., the size of the array would simply depend on the amount of memory one wished to produce). Pohm et al. described his deposition tools as “rudimentary” even back in 1969 (~25 years before Applicants’ earliest effective filing date), which led to the production of ~1,000 samples. Thus, with the advent of 25 years of continued research, progress in the formation of larger arrays would be expected. Furthermore, Pohm et al. state that only a unit of “modest” size can produce a 1,024 array using “rudimentary” techniques and that “better approaches” were available even back in 1969 (e.g., see Pohm et al., page 411, column 2, paragraph 1 where the author clearly envisioned producing larger libraries, “For example, two 2 by 2-inch substrates should be capable of storing 1024 128-bit words <u>or more</u>”; see also Lee, page 868, column 2 paragraph 1 showing 6400 elements/in^2, which would produce an array of 25,600 elements for the 2×2 inch substrate disclosed by Pohm et al.). Thus, a person of skill in the art would reasonably have expected to be successful because better fabrication techniques were available even in 1969 and later publications show that fabrication line widths could be reduced by several orders of magnitude (e.g., see the combined references of Lee, Brown et al., Makin et al., Jubb et al., and Howard et al., Introduction; see also Conclusion, “experiments show that 1-2 μm wide conductors for integrated-circuit applications can be fabricated using an Al-based metallurgy to yield excellent electromigration lifetimes”)

For ***claims 34, 35 and 69***, the combined references of Lee, Brown et al., Makin et al., Jubb et al., and Howard et al. disclose the use of eight components including a

polymeric material. For example, Makino et al. disclose the use of a two layer Ni-P/polyparaxylylen polymer to protect permalloy in from oxidation. Thus, when combined with the teachings of Pohm et al. an "eight" layer (component) array would be produced (e.g., Cr, Ni-Fe, Cu, Ti, Ni-F, Ferrite, Ni-P, polyparaxylylen). In addition, the array would contain the "polymeric" polyparaxylylen.

For ***claim 58***, the combined references of Lee, Brown et al., Makin et al., Jubb et al., and Howard et al. disclose intermetallic compounds of Al (e.g., see Howard et al., abstract and title).

For ***claims 84-87***, the combined references of Lee, Brown et al., Makin et al., Jubb et al., and Howard et al. disclose the use of a thickness gradient when creating memory chips (e.g., see Brown et al., figure 8 showing thickness gradient between 2.7 μm and 1.6 μm regions).

For ***claim 95***, Pohm et al. disclose two layers ranging from 100 A to about 1000 A and a third layer that overlaps with this range e.g., 1000-1500 A (see Table 1), which renders the claimed ranged prima facie obvious. For example, in the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists. *In re Wertheim*, 541 F.2d 257, 191 USPQ 90 (CCPA 1976); *In re Woodruff*, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. cir. 1990).

It would have been prima facie obvious to one of ordinary skill in the art at the time the invention was made to use the Ni-P/polyparaxylylen layers as disclosed by the combined references of Lee, Brown et al., Makin et al., Jubb et al., and Howard et al. to

protect the permalloy films from corrosion as disclosed by Pohm et al. because the combined references of Lee, Brown et al., Makin et al., Jubb et al., and Howard et al. explicitly state that their Ni-P/polyparaxylylen layers can be used for this purpose (e.g., see Makino et al., abstract). Furthermore, a person of skill in the art would have been motivated to use the Ni-P/polyparaxylylen layers because Makino et al., for example, state, "The Ni-P layer coated on the film is remarkably effective to prevent corrosion … [and] no corrosion takes place [when Ni-P is used in conjunction with polyparaxylylen]" (e.g., see Makino et al., page 502, Conclusion). The combined references of Makino et al. also state that such protection is useful for improving the reliability of memory storage devices (e.g., see Makino et al., Introduction and Discussion), which would encompass the memory storage applications disclosed by Pohm et al. Furthermore, a person of ordinary skill in the art would have reasonably expected to be successful because the Ni-P/polyparaxylylen layers are used in conjunction with permalloy films like the permalloy film disclosed by Pohm et al.

It would also have been *prima facie* obvious to one of ordinary skill in the art at the time the invention was made to use intermetallic compounds as taught by the combined references of Lee, Brown et al., Makin et al., Jubb et al., and Howard et al. to construct the memory cells as taught by Pohm et al. because the combined references of Lee, Brown et al., Makin et al., Jubb et al., and Howard et al. explicitly state that intermetallic compounds can be used in integrated-circuit technology (e.g., see Introduction), which would encompass the memory cell applications of Pohm et al., Lee

and Makino et al. (e.g., see Pohm et al., abstract). Furthermore, one of ordinary skill in the art would have been motivated to use the intermetallic compound of Al because the combined references of Lee, Brown et al., Makin et al., Jubb et al., and Howard state that their use can lead to a reduction in the line width of metal interconnections which is favorable for integrated-circuit design (e.g., see Howard et al., Introduction; see also Conclusion, "experiments show that 1-2 μm wide conductors for integrated-circuit applications can be fabricated using an Al-based metallurgy to yield excellent electromigration lifetimes"). Furthermore, one of ordinary skill in the art would have reasonably expected to be successful because both Pohm et al. and the combined references of Lee, Brown et al., Makin et al., Jubb et al., and Howard teach that their method can be applied for integrated-circuit technology using metal deposition techniques. Finally, it would have been prima facie obvious to use the bubble design with the thickness gradient as disclosed by Brown et al., in conjunction with memory chip design as disclosed by Pohm et al. because Brown et al. teach that such a design can improve the storage capacity of the memory chip. A person would reasonably have expected to be successful because Brown et al. disclose the use of Ni-Fe layers like the ones disclosed by Pohm et al. in the memory construction.

In addition, it would have been prima facie obvious to one of ordinary skill in the art to alter the stoichiometry of the permalloy layer as taught by the combined references of Lee, Brown et al., Makin et al., Jubb et al., and Howard et al. to study and/or change the magnetic properties of the memory array as disclosed by Pohm et al. because Jubb et

al., for example, explicitly state that such an alteration would have an effect on the materials low coercivities, minimal eddy current losses, and excellent high-frequency response (e.g., see Jubb et al., Introduction), which plays a favorable role in magnetic recording applications like the memory chip disclosed by Pohm et al. (e.g., see Pohm et al., abstract). In addition, a person of skill in the art would have been motivated to alter the stoichiometry to find the optimum working conditions for the memory device as the stoichiometry directly affects the materials performance in such applications (e.g., see Jubb et al., Results and discussion). A person of skill in the art would reasonably have expected to be successful because multi-layer permalloys are used in both references.

Response

6. To the extent that Applicants' arguments could be applied against the current rejection, the following comments below are noted:

[1] Applicants argue, "Applicants traverse the rejection based on the above discussion of Pohm" (e.g., see 4/10/07 response, page 20, paragraph 1).

[1] To the extent that Applicants are merely repeating their previous arguments, it is respectfully submitted that those issues were adequately addressed above.

[2] Applicants argue, "The anticipation rejection relies on inherency, at least in part. It is now axiomatic that inherency cannot be relied upon for an obviousness rejection" and Applicants

cite W.L. Gore & Associates, Inc. presumably for support (e.g., see 4/10/07 response, page 20, paragraph 1).

[2] The Examiner is unaware of any such rule. See *Connell v. Sears, Roebuck & Co.*, 722 F.2d 1542, 1548 (Fed. Cir. 1983) ("anticipation is the epitome of obviousness"); see also *In re Skoner*, 517 F.2d 947, 950, 186 USPQ 80, 83 (CCPA 1975); *In re Pearson*, 494 F.2d 1399, 1402, 181 USPQ 641, 644 (CCPA 1974). Thus, if a claim has been properly anticipated using an inherency argument than it has also been rendered obvious because as noted in Connell, "anticipation is the epitome of obviousness." See also *In re Napier*, 55 F.3d 610, 613, 34 USPQ2d 1782, 1784 (Fed. Cir. 1995), where the court affirmed a 35 U.S.C. 103 rejection based in part on inherent disclosure in one of the references, which expressly refutes Applicants' position ("The inherent teaching of a prior art reference, a questions of fact, arises both in the context of anticipation and obviousness") (emphasis added). See also *In re Grasselli*, 713 F.2d 731, 739, 218 USPQ 769, 775 (Fed. Cir. 1983).

[3] Applicants also argue that the combined references do not teach every element of the claims (e.g., see 4/10/07 response, paragraph bridging pages 20 and 21).

[3] It is respectfully submitted that all elements are taught as set forth in above rejection.

Allowable Subject Matter

7. As noted previously (see 10/12/06 Final), claims 94 and 97 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jon D Epperson whose telephone number is (571) 272-0808. The examiner can normally be reached Monday-Friday from 9:00 to 5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, James (Doug) Schultz can be reached on (571) 272-0763. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (571) 272-1600.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Jon D. Epperson/
Primary Examiner, AU 1639